Claims

1. A microactuator (1, 60, 7) comprising a chamber (2, 63, 720), called the main chamber, produced in a solid support (3) and containing a pyrotechnic charge (6, 721), called the main charge, said main chamber (2, 63, 720) being hermetically sealed and bounded, on the one hand, by solid walls of the support and, on the other hand, by a deformable membrane (4, 62, 710), so that the gases emitted by the combustion of the main pyrotechnic charge (6, 721) cause the volume of said main chamber (2, 63, 720) to increase by deforming said membrane (4, 62, 710), while leaving the solid walls of the main chamber (2, 63, 720) intact, characterized in that said microactuator includes means for evacuating the gases from the main chamber (720).

2. The microactuator (1, 60, 7) as claimed in claim 1, characterized in that the gas evacuation means can be actuated upon command.

3. The microactuator (7) as claimed in claim 1 or 2, characterized in that the gas evacuation means comprise an evacuation duct (730) that runs at one end into the main chamber (720) and at another end to the outside of the support, the duct (730) being initially closed off during deformation of the membrane (710), the evacuation means also including means for opening the duct (730) that are actuated in order to allow evacuation of the gases via the duct (730) from the main chamber (720) to the outside of the support.

4. The microactuator (7) as claimed in claim 1 or 2, characterized in that the gas evacuation means comprise at least one evacuation duct (730) that runs at one end into the main chamber (720) and at another end into another chamber (722), called the secondary chamber, which is hermetically sealed, the evacuation duct (730) being initially closed off during deformation of the

membrane (710), the evacuation means also including means for opening the duct (730), which are actuated in order to allow evacuation of the gases via the duct (730) from the main chamber (720) into the secondary chamber (722).

5. The microactuator (7) as claimed in claim 3 or 4, characterized in that the evacuation duct (730) is closed off by a plug (723).

6. The microactuator (7) as claimed in claim 5, characterized in that the plug (723) consists of a pyrotechnic charge.

7. The microactuator as claimed in any one of claims 4 to 6, characterized in that another pyrotechnic charge, called the secondary pyrotechnic charge (724), is housed in one of the two chambers (720, 722).

8. The microactuator as claimed in claim 7, characterized in that each of the pyrotechnic charges (6, 721, 723, 724) is deposited on a conductive heating track with a deposition thickness of less than 200 μm.

9. The microactuator as claimed in claim 7 or 8, characterized in that each of the pyrotechnic charges (721, 724), main charge or secondary charge, may be in the form of a film covering a cavity hollowed in the support (3).

10. The microactuator as claimed in any one of claims 1 to 9, characterized in that the support consists of a stack of several layers (71, 72, 73, 74).

11. The microactuator as claimed in any one of claims 6 to 10, characterized in that the pyrotechnic charges (6, 721, 723, 724) are formed by a nitrocellulose-based composition.

12. The microactuator as claimed in any one of claims 1 to 11, characterized in that the volume of the main chamber (2, 63, 720) is less than 1 cm^3.

13. The microactuator as claimed in claim 12, characterized in that the charging density, which is the ratio of the mass of the main pyrotechnic charge (6, 721) to the volume of the main chamber (2, 63, 720), is between 0.01 $\mu g/mm^3$ and 0.1 mg/mm^3.

14. The microactuator as claimed in claim 1, characterized in that the membrane (62) is flexible and folded (62) in said chamber (63), said membrane (63) being capable of unfolding under the effect of the gases emitted by the pyrotechnic charge (6).

15. The microactuator as claimed in any one of claims 1 to 14, characterized in that the membrane (4, 62, 710) is made of Teflon.

16. A microsystem that includes a microactuator (1, 60) as claimed in any one of claims 1 to 18, characterized in that it comprises a solid part, the deformation of the membrane (4, 62) causing displacement of the solid part (15, 21, 64).

17. The microsystem as claimed in claim 16, characterized in that the solid part (15) pivots under the effect of the combustion gases and obstructs a fluid duct (12).

18. A microsystem that includes a microactuator (60) as claimed in any one of claims 1 to 15, characterized in that:

i) a flexible membrane (62) is located in an annular space (63) that can be likened to a groove and constitutes the main chamber;

ii) the pyrotechnic charge is located in an annular space that can be likened to a groove of

smaller dimension than that in which the flexible membrane (62) is located, and positioned concentrically with respect to the latter, the two grooves communicating with each other via at least one opening; and

iii) a flat solid part (64) bears against the support (61) by covering the annular space (63) in which the flexible membrane (62) is located, said part (64) being itself covered by an elastic membrane (67) and obstructing a fluid duct (68),

in such a way that the gases emitted by the combustion of the charge cause the flexible membrane (62) located in the annular space (63) to be deployed and cause the flat part (64) to be displaced, resulting in fluid being drawn into the space that the elastic membrane (67) creates when it moves away from the support (61).

19. A microsystem that includes a microactuator as claimed in any one of claims 1 to 15, characterized in that the membrane (4) deforms under the effect of the combustion gases, so as to close off a fluid duct.

20. A method of using a microactuator as defined in claim 3 or 4, in order to close or open a fluid microcircuit and then to open or close, respectively, a fluid microcircuit.

21. A method of using a microactuator as defined in claim 3 or 4, in order to close or open a fluid microcircuit, then to open or close, respectively, the fluid microcircuit and then to close again or open again, respectively, the fluid microcircuit.